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ABSTRACT

A study investigated the immediate comprehension processes involved in the interpretation of English idiomatic expressions. Idioms such as "bury the hatchet" were presented to 48 college students in sentential contexts that either biased the subject toward a literal or a figurative interpretation or left the interpretation ambiguous. In control sentences, the final words of the idiom were used in nonidiomatic expressions. Subjects monitored the sentences for specified targets. In all cases, the target words were the final words of the idiomatic phrases. The subjects were instructed to detect words that were identical to a cue word, that rhymed with a cue word, or that were members of semantic categories specified by cue words. Reaction times were recorded from the onset of the targets to the subjects' responses. Subjects detected identity, rhyme, and category matches more rapidly in all three idiomatic contexts than in the nonidiomatic control contexts. However, for literal and ambiguous idioms, category decisions were slower than rhyme decisions, while category matches were made as rapidly as rhyme matches for the control sentences. The results suggest that idioms are automatically processed as discrete lexical entries. (Author/FL)

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Interpreting Idioms[1]

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Abstract

Immediate comprehension processes involved in the interpretation of idiomatic expressions were investigated. Idioms like "bury the hatchet" were used in sentential contexts that (1) biased the listener toward a literal interpretation, (2) biased the listener toward a figurative interpretatin, or (3) left the interpretation ambiguous between the literal and figurative readings. In control sentences, the final words of the idioms were used in non-idiomatic expressions. Listeners monitored the sentences for specified targets. In all cases, the target words were the final words of the idiomatic phrases. The listeners were instructed to detect words that were identical to cue words, that rhymed with the cue words, or that were members of semantic categories specified by cue words. Thus "hatchet" was cued with either "hatchet," "ratchet," or "a tool." Reaction-time latencies from the onset of the targets to the listeners' responses were obtained. IDENTITY, RHYME, and CATEGORY matches were detected more rapidly in all three idiomatic contexts than in the non-idiomatic controls. However, for literal and ambiguous idioms, CATEGORY decisions were slower than RHYME decisions. For the controls as well as for the figurative idioms, CATEGORY matches were made as rapidly as RHYME matches. These results suggest that idioms are automatically processed as discrete lexical entries.

Utterances may be located along a gradient of "originality." This gradient ranges from conventional, reflexive expressions such as expletives through repetitive, formulatic utterances like greetings to unique, novel allusions and sayings (Bolinger, 1978; Steinmann, 1973). Figurative language occupies no single point on this gradient; original metaphors fall toward one end whereas frozen metaphors, proverbs, and idioms lie on the other. Models of comprehension processes must be general enough to apply to utterances across this gradient of originality. Both novel metaphors and frozen idioms and proverbs are challenges to most contemporaty models of comprehension.

Idioms and proverbs appear to be rapidly and automatically processed in appropriate contexts. Reading time advantages have been observed for figurative idioms and proverbs compared to literal ones (Gibbs, 1980; Kemper, 1981; Ortony, Schallert, Reynolds, and Antos, 1980). Two explanations of the reaction time advantage for figurative idioms are possible: (1) Idioms are simultaneoulsy processed as discrete lexical entries and as literal word strings. Swinney and Cutler (1979) proposed that the figurative meanings of idioms are dirctly represented in the lexicon and accessed automatically following recognition of the idiom's initial word. The computation of the literal meaning of the idiom is undertaken simultaneously with the retrieval of the stored meaning for the entire string. For isolated idioms, the retrieval of stored, figurative meanings is faster than the computation of novel, literal meanings. A similar advantage could occur whenever idioms are used in biasing contexts. (2) Gibbs (1980) suggests that a "double-take" reaction accounts for the observed reaction-time advantage

of figurative idioms over literal ones. He suggests that the automatic retrieval of an idiom's figurative meaning preceeds the computation of its literal meaning. Only when the figurative meaning is discovered to be inappropriate is the computation of literal meaning initiated. The processes of discovering that the figurative meaning is inappriapriate and of initiating the computation of literal meaning result in a reaction time advantage for figurative idioms.

The present research was designed to compare the processing of identity, phonological, and semantic information about literal and figurative idioms. The sentence-monitoring tasks of Marslen-Wilson and Tyler (1980) were used. In each task, the subject listens to a sentence for the occurrence of a target word. The target is specified in advance by one of three different cues. (1) In the IDENTITY task, the subjects are told the exact word to listen for. Their reaction time to detect the word is assumed to reflect only word recognition processes. (2) In the RHYME task, the subjects monitor for a word that rhymes with a specified cue. Reaction time in this task involves both word recognition processes and phonological analysis and comparison. (3) In the CATEGORY task, the subjects listen for a word that is a member of a specified semantic category. Both word recognition and semantic analysis and comparision are required.

Marslen-Wilson and Tyler (1980) have argued for an on-line, interactive approach to sentence comprehension. In their approach, semantic information about a word is not necessarily dependent on the prior phonological analysis of the word. Rather, contextual constraints make available semantic, as well as phonological, information about the

properties of word cohorts (classes of syntactically and samantically possible words). This cohort information is matched against the acoustic input during word recognition. One result of this process is that the identity, phonological properties, and semantic content of words can be determined, and a response initiated, before the entire word is actually heard. Thus in normal prose contexts, responses in the RHYME and CATEGORY tasks are made after hearing only one or two phonemes of the target words.

These three tasks were used to investigate the effects of biasing contexts on the interpretation of idioms. Sentences containing literal, figurative, and ambiguous idiomatic expressions were created. In each task, the target words, defined by the cues, were the final words of the idioms. In control sentences, the idioms' final words were used in non-idiomatic contexts. Reaction times in the three tasks were assumed to reflect the availability of information about the identity, phonological properties, and semantic content of the target words.

Method

Subjects. Forty-eight native speakers of English participated. All were recruited from introductory psychology courses and received course credit for their participation.

Materials. Twenty-four sentence sets were prepared. Each set was designed around a common idiom and included sentences in which (1) the idiom was used figuratively, (2) the idiom was used literally, and (3) the idiom's use was ambiguous between the literal and figurative interpretations. A fourth sentence in each set contained the final word of the idiom used in a non-idiomatic expression.

These materials were selected from a larger set of materials on the basis of a preliminary study. In this study, 40 judges rated sentences on a seven point scale. On this scale, "1" indicated that the sentence contained an expression used idiomatically and "7" indicated that the sentence contained only literal expressions. Sets of sentences were selected so that the literal idioms received ratings between 5 and 7 (mean = 6.35), ambiguous idioms were rated between 3 and 5 (mean = 3.71), and figurative idioms were rated between 1 and 3 (mean = 1.71). Table 1 presents example sentence sets; t- tests confirmed that the idiomatic ratings of the three sets of sentences were significantly different (figurative vs ambiguous: t (23) = 9.52, $p < .05$; ambiguous vs literal: t (23) = 12.57, $p < .05$).

Insert Table 1 about here

Four lists of 24 sentences were prepared. Each list contained six sentences of each type (e.g., literal, ambiguous, figurative, control). One sentence from each set occurred in each list. The sentences were randomly ordered. In addition, each list began with seven practice sentences. A tape recording was prepared of each list. The sentences were recorded by a female reading at a normal oral reading rate (approximately 140 words per minute). So that reaction times could be recorded, a pulse was placed on the second channel of each tape. The pulse coincided with the onset of the target word. The location of the

pulse was accurate to within ± 15 msec. This pulse started a digital millisecond timer which was stopped by pressing a response button.

For each monitoring condition, a list of cues was also prepared. For the RHYME condition, the cues were common rhymes of the target words. For the CATEGORY task, superordinate semantic categories were used as the cues. The target words themselves were the cues in the IDENTITY task. Table 1 also lists examples of the cue words.

Procedure. Each subject first read a set of instructions that described the type of monitoring task they were to perform. Each was tested individually via binaural monophonic headphones. Before each trial, the experimenter announced the cue word for the trial. The subjects were instructed to press the response button, using their perferrred hand, as soon as possible when they heard the word that corresponded to the cue. Each subject participated in a single monitoring task.

Results

For each subject, mean reaction-time latencies were determined for each type of context by averaging the latencies for individual sentences.[2] These mean latencies for literal, ambiguous, figurative, and control words were used in the first analysis of variance. In a second analysis, mean latencies for each word were determined by averaging across those for individual subjects. Thus in the first ANOVA, subjects were treated as a random effect with condition (IDENTITY, RHYME, and CATEGORY) and use (literal, ambiguous, figurative, control) as fixed effects. In the second ANOVA, words were a random effect with condition and use as fixed effects. Unless noted, all results are

significant at the $p < .05$ level (or better) in both analyzes.

Table 2 summarizes the results. The main effect for monitoring condition was significant (F 1 (2,37) = 8.35, F 2 (2,46) = 10.40) as was that for the context of the target words (F 1 (3,111) = 9. 74, F 2 (3, 69) = 7.75). The interaction was not significant (F 1 (6,111) = .91, F 2 (6, 138) = 1.62).

Insert Table 2 about here

Multiple comparisons, using a Bonferroni procedure with $\alpha = .05$, were used to examine these effects. Overall, targets in the IDENTITY condition (mean = 302 msec) were detected more rapidly than those in the RHYME condition (mean = 382 msec, t (20) = 4.29). RHYME targets were responded to more rapidly than CATEGORY targets (mean = 442 msec, t (30) = 3.22).

Compared to the non-idiomatic controls, reaction times in all three idiomatic contexts were facilitated. Targets in non-idiomatic contexts (mean = 427 msec) were detected more slowly than those in literal idioms (mean = 380 msec, t (46) = 2.52). However, reaction times to literal, ambiguous (mean = 344 msec), and figurative (mean = 350 msec) idioms did not differ significantly (both t (46) < 1.93).

Planned comparisons were also performed in order to test whether or not targets in the RHYME and CATEGORY tasks were detected equally rapidly in all four sentential contexts. For the non-idiomatic con-

trols, RHYME targets (mean = 459 msec) were detected no more rapidly than CATEGORY targets (mean = 497 msec, t (30) = 2.02). For figurative idioms, targets were detected as rapidly in the CATEGORY (mean = 361 msec) condition as in the RHYME condition (mean = 386 msec, t (30) = 1.29). In contrast, for both literal and ambiguous idioms, RHYMEs were detected more rapidly than CATEGORY matches (literal: RHYME = 378 msec, CATEGORY = 462 msec; ambiguous: RHYME = 331 msec, CATEGORY = 423 msec; both t (30) $\geq$ 4.51).

Discussion

Word identification involves an interaction between the acoustic input and the syntactic and semantic constraints of the sentential context. The present results confirm those of Marslen-Wilson and Tyler (1980). As their on-line, interactive approach to comprehension predicts, the availability of semantic information about a word is not necessarily delayed relative to that of phonological information. In the non-idiomatic control sentences of the present experiment, contextual constraints make available semantic information about possible words before the actual word is heard. As a result, RHYME and CATEGORY matches are made equally rapidly.

The present experiment, like those of Swinney and Cutler (1979), suggest that idioms are automatically processed as discrete lexical entries. Subjects were able to respond to target words in the idiomatic contexts more rapidly than in the non-idiomatic controls. The subjects were able to anticipate the identity, phonological properties, and semantic content of the idioms' final words. As a result, their responses in the three monitoring tasks were facilitated, relative to

those for the controls, by the increased syntactic and semantic constraints of the idiomatic expressions.

However, the results also indicate that literal and ambiguous targets are processed differently than figurative targets. For figurative targets, as for the controls, CATEGORY decisions were made as rapidly as RHYME decisions. For both literal and ambiguous targets, CATEGORY matches were slower than RHYME matches. Taken together, these findings indicate that listeners attempt to interpret literal and ambiguous idioms simultaneously as discrete lexical items and as literal word strings. The automatic processing of the idioms as lexical entries facilitates identity, phonological, and semantic decisions relative to the non-idiomatic controls. However, the semantic analysis of literal and ambiguous idioms is much less facilitated than their phonological analysis. Apparently, the concurrent computation of literal meaning interferes with the retrieval and processing of the semantic content of the idioms' final words. As a result, decisions in the CATEGORY task are slower than those in the RHYME task for literal and ambiguous uses of idioms.

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Footnotes

[1]This research was supported by PHS Training Grant T32 MH 15134-02 from the National Institute of Mental Health.

[2]Errors, due to the subects' responding to the wrong word or equipment failure, constituted 7% of the trials. The error rate increases with mean reaction time and was particularly low for the IDENTITY monitoring task.

Table 1

Example sentence sets and cue words.

IDIOM:	climbing the walls
IDENTITY cue:	walls
RHYME cue:	falls
CATEGORY cue:	part of a building

Literal

Orville was interested in spiders and could sit for hours and watch them climbing the walls of the garden.

Ambiguous

Orville hated prison and was climbing the walls to get out.

Figurative

By the fourth day in the hospital, Orville was climbing the walls to go home.

Non-idiomatic control

Orville began the renovation of his old house by knocking out the walls.

Table 1, continued

IDIOM:	bury the hatchet
IDENTITY cue:	hatchet
RHYME cue:	ratchet
CATEGORY cue:	a tool

Literal

To prepare for the scavenger hunt, Linda decided to hide the mirror under a flower pot, put the plate under the porch, and bury the hatchet behind the house.

Ambiguous

To symbolize the end of the dispute, the two men decided to dig a hole and bury the hatchet once and for all.

Figurative

Eventually the two men decided their argument was silly and that they should bury the hatchet once and for all.

Non-idiomatic control

The woodsman forget to take the hatchet when he went camping.

Table 2

Mean reaction times for control, literal, ambiguous, and figurative uses of the target words in the three monitoring tasks.

	IDENTITY	RHYME	CATEGORY
Control	326	459	497
Literal	299	378	462
Ambiguous	280	331	423
Figurative	303	361	386